

What is claimed:

1. A belt-feeding device of a multi-point seat belt, consisting of a first and second shoulder belt portion, a lap belt portion and an extending belt portion (1.1 to 1.4), for a transport system to increase user-friendliness and the rate of seat-belt use, comprising
5 an operating arm (20.2), to a first end of which a belt ring (20.8) is rigidly attached to receive and loosely guide the first shoulder belt portion and a second end of which is connected to a guide tube (20.1), pivotally attached to a bearing casing (20.10) of a seat-backrest frame of a seat backrest (3.2);

10 whereby

a lower part of the body (96) of a passenger and an upper part of the body (95) are restrained by the lap- and second shoulder belt portions (1.3, 1.2) when a main latch plate (9), moveable along the lap- or second shoulder belt portion, is plug-in connected to a main buckle assembly (9.1), having a master release button (84) and attached to a stiff
15 first member of the transport system; and

the upper part of the body is restrained by the first and second shoulder belt portions, both (1.1, 1.2) extending crosswise in an X-shape upon a rotatory movement of the operating arm (20.2) with the first shoulder belt portion (1.1) from a resting position at a second seat-side (SL) to an operative position at a first seat-side (SR).

20 2. The belt-feeding device according to claim 1, further comprising at least one drive apparatus, which, provided for the belt-feeding device, when activated, rotates the operating arm with the first shoulder belt portion from the resting position to the operative position or vice-versa.

25 3. The belt-feeding device according to claim 2, wherein the master release button (84), when depressed, releases the main latch plate and returns the belt-feeding device to the resting position.

30 4. The belt-feeding device according to claim 3, wherein the master release button (84) is provided with a release wire connecting to the drive apparatus where the master release button, when depressed, releases the main latch plate from the main buckle assembly and returns the belt-feeding device to the resting position.

5. The belt-feeding device according to claim 3, further comprising
a key, rigidly attached to the belt ring of the operating arm; and
a belt-feeding plate (20.9, 20.9a), a contact portion of which, moveable in an opening of the
seat backrest (3.2) at the first seat-side and guided thereby, has a receptacle through
5 which the key projects in a contact position and the operative position;
whereby the drive apparatus, being activated,
moves up over a head rest the contact portion of the belt-feeding plate out of the opening
and the guide tube with the operating arm and with the first shoulder belt portion;
rotates the operating arm and the first shoulder belt portion over the head rest, a head of the
10 passenger and in front of the upper part of his body until the key engages with the
receptacle in the contact position and
countersinks the contact portion and the guide tube with the operating arm in the seat
backrest (3.2) until reaching the operative position in which the first shoulder belt portion
extends across over the upper part of his body and, finally, the drive apparatus is switched
15 off;
where in the operative position or in the resting position the contact portion of the belt-
feeding plate and the guide tube with the operating arm are countersunk in the seat backrest.

6. The belt-feeding device according to claim 5, wherein a radial-adjustable tube (20.3) is
attached between the belt ring and the guide tube, where the first shoulder belt portion is
20 moved from the resting position to the operative position by a radial-adjusting movement of
the radial-adjustable tube when the drive apparatus is activated.

7. The belt-feeding device according to claim 5, wherein the drive apparatus is operable to
return the first shoulder belt portion (1.1) from the operative position to the resting position,
when a dwell time, predetermined for an engagement of the key with the receptacle, is
25 exceeded.

8. The belt-feeding device according to claim 5, wherein the drive apparatus returns the
first shoulder belt portion (1.1) from the operative position to the resting position, when a
dwell time, predetermined for inserting the main latch plate into the main buckle assembly, is
exceeded.

9. The belt-feeding device according to claim 5, wherein the drive apparatus, activated in
30 response to activating a switch, attached in the main buckle assembly (9.1), upon contact

with a cam of the main latch plate (9), when inserted therein, is switched off when the operative position is reached.

10. The belt-feeding device according to claim 5, wherein the drive apparatus, activated in response to starting an engine of the transport system, is switched off when the operative
5 position is reached.

11. The belt-feeding device according to claim 5, wherein the drive apparatus, activated in response to closing a vehicle door of the transport system, is switched off when the operative position is reached.

12. The belt-feeding device according to claim 5, wherein the drive apparatus, activated in
10 response to actuating a switch, is switched off when the operative position is reached.

13. The belt-feeding device according to claim 5, wherein the drive apparatus is activated when the passenger takes a seat, whereto a sensor is built, where the drive apparatus is switched off when the operative position is reached.

14. The belt-feeding device according to claim 5, wherein the drive apparatus, activated in
15 response to depressing x-times the master release button (84), is switched off when the operative position is reached.

15. The belt-feeding device according to claim 5, wherein the supplement latch plate is a belt-detachable latch plate (25), which has a quick-release pin (25.1) and a U-shaped portion to house the belt portion of the seat belt which is secured therein by the quick-release pin and
20 detached therefrom by pulling it.

16. The belt-feeding device according to claim 15, wherein the seat backrest (3.2) at the first and second seat-side is provided with pairs of supplement upper buckle assemblies (18 / 19, 18a / 19a, 18b / 19b, 18.1 / 19.1 to 18.3 / 19.3),
one of which is adapted to a small body proportion of the passenger, lower than the upper
25 buckle assembly, and,
finally, the belt-detachable latch plates, housing both shoulder belt portions, are plug-in connected to that pair.

17. The belt-feeding device according to claim 16, wherein the master release button (84) is provided with release cables (4.2), connecting to release buttons of all the supplement upper

buckle assemblies, and with a release wire, connecting to the drive apparatus, where the master release button, when depressed, releases all the latch plates from the respective buckle assemblies and returns the belt-feeding device to the resting position.

18. The belt-feeding device according to claim 16, wherein the master release button (84) is provided with release wires, connecting to electrical release-motors (4.2b) of release buttons of all the supplement upper buckle assemblies, and with a release wire, connecting to the drive apparatus, where the master release button, when depressed, releases all the latch plates from the respective buckle assemblies and returns the belt-feeding device to the resting position.

19. The belt-feeding device according to claim 17, wherein the belt-detachable latch plates, when not being used, are stored and secured in a storage box (25.5) of a seat.

20. The belt-feeding device according to claim 17, wherein a belt-catching member (20.7, 20.7a), attached to the seat backrest (3.2), intercepts and holds at least one shoulder belt portion when being in the resting position.

21. The belt-feeding device according to claim 16, wherein the upper buckle assembly is provided with a coupling fitting (1.2a, 1.2b) to receive vibration-dampening energy absorbers.

22. The belt-feeding device according to claim 4, further comprising a pair of rollover tubes (20.2b), inserted into a pair of angle fittings (26a) of the seat-backrest frame (3.4d);
a belt housing (20.4d), which, moveable along the pair of rollover tubes and guided thereby, receives and loosely guides the first shoulder belt portion; and
an additional drive apparatus, fastened to the belt housing and moveable along a threaded spindle (20.1a), fastened to the pair of angle fittings (26a);
whereby the first shoulder belt portion is moved from the resting position to the operative position by a translatory movement of the belt housing and the rotatory movement of the operating arm when both drive apparatus are activated.

23. The belt-feeding device according to claim 22, wherein the translatory movement of the belt housing and the rotatory movement of the operating arm are synchronised.

24. The belt-feeding device to protect the passenger in a rollover-accident according to claim 23, wherein the belt-feeding device (20d) serves as a protective-rollover device having the pair of rollover tubes (20.2b), along which the belt housing (20.4d), having holes to receive a pair of legs of a safety bracket (20.6), is moved to the operative position and
5 located on holes of one of the rollover tubes (20.2b),
which and the holes of the belt housing are aligned with each other and
in excess of a threshold value in the rollover-accident the pair of legs of the safety bracket protrudes through all the holes, blocks the translatory movement of the belt housing and clamps the first shoulder belt portion (1.1).

10 25. A belt-feeding device of a multi-point seat belt, consisting of a first and second shoulder belt portion, a lap belt portion and an extending belt portion (1.1 to 1.4), for a transport system and increasing user-friendliness and the rate of seat-belt use, comprising
a pair of rollover tubes (20.2b), inserted into a pair of angle fittings (26a) of a seat-backrest frame (3.4d) of a seat backrest (3.2); and
15 a belt housing (20.4d), moveable along the pair of rollover tubes from a resting position at a second seat-side (SL) to an operative position at a first seat-side (SR), guided thereby, receiving and loosely guiding the first shoulder belt portion (1.1);

whereby

a lower part of the body (96) of a passenger and an upper part of the body (95) are
20 restrained by the lap- and second shoulder belt portions (1.3, 1.2) when a main latch plate (9), moveable along the lap- or second shoulder belt portion, is plug-in connected to a main buckle assembly (9.1), having a master release button (84) and attached to a stiff first member of the transport system; and
the upper part of the body is restrained by the first and second shoulder belt portions, both
25 (1.1, 1.2) extending crosswise in an X-shape upon a translatory movement of the belt housing (20.4d) with the first shoulder belt portion (1.1) from the resting position to the operative position.

26. The belt-feeding device according to claim 25, further comprising a drive apparatus, which, fastened to the belt housing (20.4d) and moveable along a threaded spindle (20.1a),
30 fastened to the pair of angle fittings (26a), when activated, moves the belt housing (20.4d)

with the first shoulder belt portion from the resting position to the operative position or vice-versa.

27. The belt-feeding device to protect the passenger in a rollover-accident according to claim 26, wherein the belt-feeding device (20c) serves as a protective-rollover device having the pair of rollover tubes (20.2b), along which the belt housing (20.4d), having holes to receive a pair of legs of a safety bracket (20.6), is moved to the operative position and located on holes of one of the rollover tubes (20.2b),

which and the holes of the belt housing are aligned with each other and

in excess of a threshold value in the rollover-accident the pair of legs of the safety bracket

protrudes through all the holes, blocks the translatory movement of the belt housing and clamps the first shoulder belt portion (1.1).

28. The belt-feeding device to absorb a great belt force according to claim 27, wherein a stiff plate (13.3) of the seat-backrest frame (3.4d) at the first seat-side (SR) has an upper and lower oblong holes;

a belt end (ER) of the first shoulder belt portion (1.1) is connected to a belt retractor (13), having an upper and lower attachment points, and

a coupling fitting (1.2b), to receive vibration-dampening energy absorbers, and the belt retractor (13) are moveable attached together at the lowest attachment point to the lower oblong hole and the upper attachment point of the belt retractor (13) is moveable

attached to the upper oblong hole,

where in excess of a threshold value the first shoulder belt portion under the great belt force pulls the belt retractor (13) moving along the oblong holes.

29. The belt-feeding device to absorb a great belt force according to claim 27, wherein a belt end (EL) of the extending belt portion (1.4) is connected to the belt retractor (13)

attached to a stiff second member of the transport system and

a belt end (ER) of the first shoulder belt portion (1.1), located in the seat backrest (3.2) at the first seat-side (SR), is provided with a coupling fitting (1.2a) to receive vibration-dampening energy absorbers.

30. A belt-feeding device of a multi-point seat belt, consisting of a first and second shoulder belt portion, a lap belt portion and an extending belt portion (1.1 to 1.4), for a transport system to increase user-friendliness and the rate of seat-belt use, comprising

a pair of rollover tubes (20.2b), inserted into a pair of angle fittings (26a) of a seat-backrest frame (3.4d); and

a belt housing (20.4d), moveable along the pair of rollover tubes from a resting position at a second seat-side (SL) to an operative position at a first seat-side (SR), guided

thereby, receiving and loosely guiding the first shoulder belt portion (1.1);

whereby

a lower part of the body (96) of a passenger and an upper part of the body (95) are restrained by the lap- and second shoulder belt portions (1.3, 1.2) when a main latch plate (9), moveable along the lap- or second shoulder belt portion, is plug-in connected to a main buckle assembly (9.1), having a master release button (84) and attached to a stiff member of the transport system; and

the upper part of the body is restrained by the first and second shoulder belt portions, both (1.1, 1.2) extending crosswise in an X-shape upon a translatory movement of the belt housing (20.4d) with the first shoulder belt portion (1.1) from the resting position to the operative position.

31. The belt-feeding device according to claim 30, further comprising a drive apparatus, which, fastened to the belt housing (20.4d) and moveable along a threaded spindle (20.1a), fastened to the pair of angle fittings (26a), when activated, moves the belt housing (20.4d) with the first shoulder belt portion from the resting position to the operative position or vice-versa.